## The GeoPRISMS Eastern North American Margin Community Seismic Experiment (ENAM CSE)

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The Eastern North American Margin Community Seismic Experiment, or ENAM CSE, is an ambitious effort to collect a suite of onshore and offshore seismic data within the ENAM focus site of the GeoPRISMS Rift Initiation and Evolution (RIE) initiative as a community-driven experiment with completely open data access. The study area, focused on the East Coast margin around Cape Hatteras, North Carolina, targets the rifted margin from unextended continental lithosphere onshore to mature oceanic lithosphere offshore. Furthermore, the study area encompasses along-strike changes in margin structure and two major fracture zones that are associated with significant offsets at the modern Mid-Atlantic Ridge. The experiment was designed to allow for multiscale imaging of crustal and mantle lithospheric structure and stacked geomorphological features over a regionally extensive, shoreline-crossing footprint.

The philosophy of the ENAM CSE is that of a community experiment, as articulated in the GeoPRISMS implementation plans. Specifically, the ENAM CSE comprises a large field effort planned and executed by the community rather than by a small group of PIs, with the data made publicly available immediately. The ENAM





CSE was designed to address four specific goals: 1) To understand the roles of inheritance and magmatism on rifting and rupture, 2) To understand passive margin evolution from rifting to surface processes and active tectonics today, 3) To provide an open-access dataset that is openly available and useful for a variety of science targets, and 4) To increase the number of scientists taking advantage of marine seismic data through a broad training program. These big-picture goals relate to a host of more specific science questions articulated in the GeoPRISMS ENAM implementation plan, including those related to the distribution of deformation and magmatism during rifting, along-strike segmentation, the influence of deep mantle dynamics, the rift-to-drift transition, and the ongoing evolution of the passive margin.

ENAM CSE data were successfully collected during 2014-2015 and have been (or very soon will be) publicly released to the community via the IRIS Data Management Center and other data portals. Data acquisition efforts included the deployment of 30 broadband ocean bottom seismometers (OBS) in spring 2014 and their recovery in spring 2015; during this time, three onshore broadband seismometers were deployed on the Outer Banks of North Carolina. These deployments overlapped with the operation of USArray Transportable Array (TA) stations in the Carolinas and Virginia. Offshore active source data were collected in September-October 2014 with the R/V Langseth, which shot refraction data that were recorded by short-period OBS instruments deployed by the R/V Endeavor. The Langseth also acquired multi-channel seismic (MCS) data along the primary transects as well as MCS-only data along shorter ancillary lines. The Fall 2014 offshore shots were also recorded with short-period seismometers deployed onshore. Finally, a series of land seismic shots were shot in June 2015; 11 on-land shots were fired and recorded on ~1400 Texans deployed along two lines onshore.

## Project URLs:

http://www.ig.utexas.edu/enam/ http://enamseismic.blogspot.com/ http://geoprisms.org/initiatives-sites/rie/enam/ http://ds.iris.edu/mda/YO?timewindow=2014–2015

## Entraining young scientists in amphibious seismology through the Eastern North American Margin Community Seismic Experiment

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One of the goals of the GeoPRISMS Eastern North American Margin (ENAM) Community Seismic Experiment (CSE) was to involve students and young scientists in acquiring the diverse onshore/offshore, active/passive seismic datasets involved in this program and to provide them with training in data collection, analysis, and interpretation. The program was extremely successful in this regard. Overall, 79 unique individuals (students and young scientists) from 48 universities participated in the field work and data analysis training workshops held at UTIG and LDEO.

We brought students and young scientists to sea on four cruises and involved them in a suite of onshore seismic deployments/recoveries. The cruises included 1) deploying broadband ocean bottom seismometers (OBS) aboard the R/V Endeavor (April 2014), 2) acquiring seismic reflection data aboard the R/V Langseth (Sept-Oct 2014), 3) deploying and recovering short-period OBS for the active source program aboard the R/V Endeavor (Sept-Oct 2014), and 4) recovering broadband OBS aboard the R/V Endeavor (April 2015). The onshore

activities included 1) deploying (May 2014), servicing (Sept 2014, Jan 2015) and recovering (May 2015) a small array of broadband seismometers; 2) deploying short period seismometers to record the offshore experiment (September 2014), 3) recovering the short period seismometers (October 2014) and 4) acquiring onshore refraction data (June 2015). We advertised the opportunity to participate in these field programs through the IRIS and GeoPRISMS listervs, and a large number of people expressed interest. In total 24 unique people participated in the research cruises and 28 in the onshore field work.

We also held data processing workshops in seismic refraction data analysis at UTIG and in Clockwise from top: Student checks status of short period seismometer; Students and OBS Technicians prepare OBS for deployment Students put a bird on the streamer.



seismic reflection analysis at LDEO. As with the field work, we advertised the opportunity to participate in these programs through listservs and received an enormous number of applications (e.g., ~80 people applied for the MCS workshop). Twenty participants took part in the refraction workshop and learned about data processing and the basics of seismic velocity modeling using OBS data from the ENAM program. Fourteen participants attended the seismic reflection workshop held at LDEO and learned the steps required to go from raw seismic reflection data to time-migrated images.

In summary, the GeoPRISMS ENAM CSE provided tremendous educational and field opportunities to a large number of students and young scientists from across the country. We hope that this experience will empower them to take advantage of the open-access data from ENAM and other community and legacy experiments and provide training for the next generation of geoscientists.



Left: Participants in MCS training workshop processing reflection data. Right: Participants in OBS refraction training workshop comparing tomography models.